3M™ Controltac™ Graphic Film

- Series 180
- With Comply™ Adhesive Series 180C
- With Comply™ v2 Adhesive 180Cv2-10

For the most current 3M Technical Information available to successfully use this product, please view this Bulletin electronically and click on the blue underlined links to view the relevant documents.

For Solvent and UV Screen Printing Only

1. Product Description

A. Product Features

- 2-mil white, vinyl film with a luster finish
- Excellent hiding power
- Pressure-activated adhesive for easy sliding, tacking, snap up and repositioning
- Conforms to flat surfaces, with and without rivets, simple curves, compound curves and corrugations
- Film series 180C with Comply adhesive also have air release channels for fast and easy, bubble-free graphic installations
- Film 180Cv2-10 (white only) features non-visible air release channels

B. Recommended Types of Graphics and End Uses

When constructed and used as described in this Bulletin, these types of graphics and end uses may be eligible for the 3M™ MCS™ Warranty. Please read the entire Bulletin for details.

- Indoor and outdoor graphics and signs, including point-of-purchase and displays
- Commercial vehicles, straight trucks, semi-trucks and semi-trailers; emblems or striping
- Bus graphics
- Rail car graphics
- Transparent film color 114 can be used for two-way emblems for windows, except on buses or other vehicles
- Small format original equipment manufacturer's (OEM) decorative and identification graphics, cautionary and safety labeling

C. Performance Overview

3M tests the performance of both individual products and finished graphic constructions. This table shows the best performance expected from this product without a Warranty Period and with a Warranty Period.

For detailed graphic construction and application options along with specific Warranty Periods, please see the Warranty Information, Section 5 on page 5.

Expected Performance Life. This is the estimated period of time the product should perform satisfactorily.	
Unprinted film with no graphic protection, applied to a flat vertical outdoor surface.	10 years Unwarranted Period
3M™ MCS™ Warranty. This is the maximum period of time 3M will warrant the finished graphic performance.	
Unprinted with no graphic protection or printed film with the best 3M ink and graphic protection option, applied to a flat, vertical, vehicle type surface.	7 years Warranty Period

D. Limitations of End Uses

This 3M product is not designed or recommended for the following uses. Please contact us to discuss other options.

(1) Unsuitable End Uses for This Film

- Do not use for graphics applied to:
  - stainless steel (we recommend using 3M™ Controltac™ Graphic Film 181-10 instead)
  - non-3M films (see Removal Warranty).
  - painted substrates with poor paint to substrate, or paint-to-paint bond.
  - substrate surfaces that are not clean and smooth (little or no variation in texture).
- Do not use the film without graphic protection for:
  - printed vehicle graphics.
  - exposed to abrasive conditions, harsh cleaners or chemicals.
  - horizontally-exposed outdoor applications.
- Do not use the film for graphics that require clean removal from:
  - applications with poor paint-to-substrate adhesion.
  - existing graphics that must remain intact; damage may occur during removal of film.
  - horizontally-exposed outdoor applications
- Do not use for graphics subjected to gasoline vapors or spills, including those at or on gas pumps, automobile fuel-tank ports, or top-feeding, petroleum tankers

(2) Wall Graphics

Two-mil cast films are typically the best choice for indoor smooth surface wall graphics. However, the user is responsible for determining the product's suitability, including adhesion and, if required, removal characteristics. Due to the wide variability of smooth indoor walls, neither finished graphics nor removal is warranted, even for removable or changeable films. 3M Instruction Bulletin 5.37 provides comprehensive information for the most successful wall graphics film selection and application.

(3) Important Information About Bus Applications

Film used on buses must not be applied so as to restrict the safe use of emergency window exits. See the most current version of 3M Instruction Bulletin 5.4 for details.

2. Compatible Products

The following products are approved by 3M for use with the base film covered in this Bulletin and used for the creation of a graphic that may be eligible for the 3M™ MCS™ Warranty. Click on the blue underlined text to view the Product Bulletin for that product.

A. Screen Printing Inks

- 3M™ Screen Printing Ink Series 1900 *line color and four color*
- 3M™ Screen Printing UV Ink Series 9800 *line color and four color*
- Sericol™ Duracal™ UV Screen Print Ink* *(approved for OEM applications only)*
- Sericol™ Duracal™ Screen Print Clear* *(approved for OEM applications only)*

* To identify a Sericol inks distributor, contact FUJIFILM North America Corporation, Graphic Systems Division at http://www.fujifilmusa.com/products/graphic_arts_printing/index.html : 1101 W. Cambridge Drive, Kansas City, KS 66103; Tel: 1-800-255-4562 or 913-342-4060.

B. Graphic Protection

- 3M™ Screen Print Gloss Clear 1920DR
- 3M™ Screen Print Matte Clear 1930
- 3M™ Screen Print UV Gloss Clear 9800CL
- 3M™ Screen Print Matte Clear 9730
- 3M™ Screen Print UV Gloss Clear 9740i

C. Other Products

- 3M™ Premasking Tape SCPM-3
- 3M™ Premasking Tape SCPM-44X
- 3M™ Prespacing Tape SCPS-2
- 3M™ Prespacing Tape SCPS-55 *for films with Comply™ Adhesive*
- 3M™ Edge Sealer 3950
- 3M™ Edge Sealer Tape 8914

3. Characteristics

These are typical values for unprocessed product. Processing may change the values. Contact your 3M representative for a custom specification.

A. Physical Characteristics

Characteristic	Value
Material	Cast vinyl
Color	See Section C, Color Table
Finish	Luster
Thickness	**Without adhesive:** 2 mil (0.05 mm) **With adhesive:** 3-4 mil (0.08-0.10 mm)
Adhesive	**Film series 180:** Pressure-activated (slide, tack, snap up, reposition) **Film series 180C, 180Cv2-10:** Pressure-activated (slide, tack, snap up, reposition) with air release channels
Adhesive color	Gray or clear, see Section C, Color Table
Liner	Polyethylene-coated paper
Adhesion, Typical *24 hours after application*	ABS 4-5 pounds/inch (0.72-0.89 kg/cm) Acrylic enamel 3-4 pounds/inch (0.54-0.72 kg/cm) Aluminum, anodized 7-8 pounds/inch (1.26-1.43 kg/cm) Aluminum, etched 5-6 pounds/inch (0.89-1.08 kg/cm) Chrome 4-5 pounds/inch (0.72-0.89 kg/cm) Fruehauf pre-painted panels 3-5 pounds/inch (0.54-0.89 kg/cm)
Tensile strength	5 pounds/inch at 73°F (0.9 kg/cm at 23°C)
Chemical resistance	• Resists mild alkalis, mild acids, and salt • Excellent resistance to water *(does not include immersion)* • Resists occasional fuel spills
Flammability	ASTM E84 reports: 180, 180C

B. Application Characteristics

Characteristic	Value
Finished graphic application recommendation	**Surface type:** Flat, with and without rivets, simple curves, compound curves, and corrugations **Substrate type:** ABS resins, aluminum, chrome, glass, fiberglass reinforced plastics, paint (check adhesion to powder-coated or water-based paints) **Application method:** Dry **Application temperature:** *air and substrate* • Flat without rivets: 40°-100°F (4°-38°C) • Curves or corrugations with rivets: 50°-100°F (10°-38°C) • Compound curves: 60°-90°F (16°-32°C)
Applied shrinkage	0.015 inches (0.4 mm)
Temperature range after application	-65° to +225°F (-60° to +107°C)
Graphic removal	Removable with heat and/or chemicals from most substrates within the Warranty Period at 50°F (10°C) minimum (air and substrate)

C. Color Table

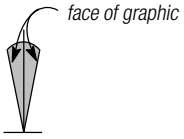
Solid Colors								Metallic and Transparent	
10	White	38	Royal Purple*	88	Violet*	201	Slate*◆
12	Black	39	Tan	96	Teal*	203	Red*◆
13	Tomato Red	41	Dark Gray*	98	Dark Violet*	211	Charcoal*◆
14	Bright Orange	46	Kelly Green	103	Magenta*◆	216	Sage Green*◆
15	Bright Yellow*†	47	Intense Blue	120	Satin Aluminum	217	Dark Blue*◆
17	Vivid Blue	49	Beige	131	Satin Gold*	220	Light Silver*◆
19	Deep Mahogany	53	Cardinal Red	173	Salmon Pink*◆	221	Gray*◆
22	Matte Black*	54	Light Orange	176	Aqua*◆	227	Bright Blue*◆
23	Deep Red	56	Dark Green	186	Bright Green*	228	Dark Burgundy*◆
25	Sunflower*†	57	Olympic Blue	196	Apple Green*	229	Copper*◆
27	Indigo (Navy)	58	Burgundy*	307	Dark Aqua*	237	Silver Blue*◆
29	Russet Brown	63	Geranium *			239	Chocolate Brown*◆
31	Medium Gray*	77	Peacock Blue			241	Gold*◆
37	Sapphire Blue					114	Transparent*†

* Indicates clear adhesive; all other adhesive is gray-pigmented
† Indicates minimal or no hiding power
◆ Available in film series 180C only.

4. Definitions

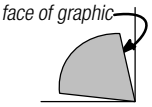
A. Exposure Types

U.S. Vertical Exposure



The face of the graphic is +/- 10° from vertical.

U.S. Non-vertical Exposure



The face of the graphic is greater than 10° from vertical and greater than 5° from horizontal. This includes non-vertical surfaces of vehicle wraps or fleet truck and trailer graphics.

U.S. Horizontal Exposure

The face of the graphic is +/- 5° from horizontal.

U.S. Desert Southwest Exposure

Any outdoor graphic exposed to solar energy more than half of the daylight hours in Arizona, New Mexico and the desert areas of California, Nevada, Utah and Texas is subject to reduced warranties. Click here for a detailed map.

B. Graphic Construction

The products used to make a graphic, which may include film and/or flexible substrate, graphic protection, ink, printer and application tape.

C. Graphic Protection

Overlaminate films or clear coats used to protect the graphic and/or change gloss.

D. Graphic Types

As identified in Product Warranty Matrices

Indoor Signs Stationary graphics applied indoors and *not* exposed to the elements.

Outdoor Signs Stationary graphics applied outdoors and exposed to the elements.

OEM Labels and decorative graphics produced for and used by original equipment manufacturers. May also be called decals.

Vehicle Types

Vehicle. Buses, vans, passenger vehicles, delivery trucks, pickup trucks, enclosed trailers.

Straight Trucks, Semi-Tractors and Semi-Trailers. Straight trucks, semi-tractors and semi-trailers used for commercial business purposes. Excludes air shields. May be eligible for a Lifetime Warranty.

Recreational Vehicle (RV). Vehicles used for personal pleasure, such as campers, motor homes and trailers, that are not used in connection with any commercial or business enterprise.

Rail. Rail cars and lead cars of trains, light rail and subways, but not locomotives or engines.

5. Warranty Information

A. Warranty Coverage Overview

The Warranty coverage for each graphic is based on the user(s) both reading and following all applicable and current 3M Product and Instruction Bulletins. 3M will honor eligible graphics for the Warranty Period stated in the base film's Product Bulletin that is current when the film was purchased. The Warranty Period may be reduced and stipulations may apply for certain constructions and applications, as covered in this Bulletin.

The following is made in lieu of all other express or implied warranties, including any implied warranty of merchantability or fitness for a particular purpose or implied warranty arising out of a course of dealing, custom or usage of trade.

B. 3M Basic Product Warranty

This product is warranted to be free of defects in materials and manufacture at the time of shipment and to meet the specifications stated in this Product Bulletin and as further set forth in the 3M Graphics Warranties Brochure.

C. Limited Remedy

3M will replace or refund the price of any 3M materials that do not meet this Warranty within the specified time periods. These remedies are exclusive.

D. Limitation of Liability

Except where prohibited by law, 3M SHALL NOT UNDER ANY CIRCUMSTANCES BE LIABLE TO PURCHASER OR USER FOR ANY DIRECT (EXCEPT FOR THE LIMITED REMEDY PROVIDED ABOVE), INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, LABOR (except for certain fleet vehicles as described later in this Bulletin), NON-3M MATERIAL CHARGES, LOSS OF PROFITS, REVENUE, BUSINESS, OPPORTUNITY, OR GOODWILL) RESULTING FROM OR IN ANY WAY RELATED TO SELLER'S PRODUCTS, SERVICES or THIS BULLETIN. This limitation of liability applies regardless of the legal or equitable theory under which such losses or damages are sought including breach of contract, breach of warranty, negligence, strict liability, or any other legal or equitable theory.

E. Additional Limitations

See the 3M Graphics Warranties Brochure at 3Mgraphics.com, which gives the terms, additional limitations of the Warranty, if any, and limitations of liability.

F. 3M™ MCS™ Warranty

Subject to Stipulations set forth in Section G, below

Finished graphics constructed with the materials specified and the exposure specified in the Warranty Period tables, Section F(1), are eligible for the 3M™ MCS™ Warranty. For warranties for other exposures, see Section G(1) on page 9.

(1) Warranty Period for Finished Graphics in a Standard U.S. Vertical Exposure

See Section 4D on page 4 for Graphic Type definitions:
VEH = Vehicle, RV, Straight Truck, Semi-Tractor and Semi-Trailer Graphics
RAIL = Railroad Graphics
SIGN = General Indoor and Outdoor Signs
OEM = OEM Graphics

See Warranty Period Matrices on the next page.

Ink Series	No Printing				SOLVENT Ink Series 1900				UV Ink Series 9800				UV Ink Series 9800 Metallic			
Application	VEH	RAIL	SIGN	OEM	VEH	RAIL	SIGN	OEM	VEH	RAIL	SIGN	OEM	VEH	RAIL	SIGN	OEM
Film Colors	10◆●, 12●, 13◆, 14◆, 15◆, 19, 22, 23, 27, 29, 31, 38, 39, 41, 49, 58, 63, 88, 96, 98, 103, 173, 176, 186, 196, 307															
Graphic Protection																
1920DR, air dry	—	—	—	—	5	5 ◆	5	5	—	—	—	—	—	—	—	—
1920DR, oven dry	—	—	—	—	6 ■	6 ◆■	5 ■	5 ■	—	—	—	—	—	—	—	—
1930	—	—	—	—	2	2 ◆	2	2	—	—	—	—	—	—	—	—
9740i	—	—	—	—	6	6 ◆	5	5	7	7 ◆	5	5	5	—	5	5
9730UV	—	—	—	—	3	3 ◆	3	3	3	3 ◆	3	3	—	—	—	—
9800CL	—	—	—	—	—	—	—	—	5	5 ◆	5	5	5	—	5	5
None	7, LT	8 ◆	6	5	—	—	—	—	—	—	2	—	—	—	—	—

Ink Series	No Printing				SOLVENT Ink Series 1900				UV Ink Series 9800				UV Ink Series 9800 Metallic			
Application	VEH	RAIL	SIGN	OEM	VEH	RAIL	SIGN	OEM	VEH	RAIL	SIGN	OEM	VEH	RAIL	SIGN	OEM
Film Colors	17, 25◆, 37, 46, 47, 53◆, 54, 56, 57, 77															
1920DR, air dry	—	—	—	—	5	5 ◆	5	5	—	—	—	—	—	—	—	—
1920DR, oven dry	—	—	—	—	6 ■	6 ◆■	5 ■	5 ■	—	—	—	—	—	—	—	—
1930	—	—	—	—	2	2 ◆	2	2	—	—	—	—	—	—	—	—
9740i	—	—	—	—	6	6 ◆	5	5	6	6 ◆	5	5	5	—	5	5
9730UV	—	—	—	—	3	3 ◆	3	3	3	3 ◆	3	3	—	—	—	—
9800CL	—	—	—	—	—	—	—	—	5	5 ◆	5	5	5	—	5	5
None	6, LT	6 ◆	6	5	—	—	—	—	—	—	2	—	—	—	—	—
Film Colors	114, 120, 131, 201, 203, 211, 216, 217, 220, 221, 227, 228, 229, 237, 239, 241															
1920DR, air dry	—	—	—	—	5	5 ◆	5	5	—	—	—	—	—	—	—	—
1920DR, oven dry	—	—	—	—	6 ■	6 ◆■	5 ■	5	—	—	—	—	—	—	—	—
1930	—	—	—	—	2	2 ◆	2	2	—	—	—	—	—	—	—	—
9740i	—	—	—	—	6	6 ◆	5	5	5	5 ◆	5	5	5	—	5	5
9730UV	—	—	—	—	3	3 ◆	3	3	3	3 ◆	3	3	—	—	—	—
9800CL	—	—	—	—	—	—	—	—	5	5 ◆	5	5	5	—	5	5
None	6	—	5	5	—	—	—	—	—	—	2	—	—	—	—	—

LT = Lifetime
◆ = Warranty for vertical railroad applications for colors 10, 12, 13, 14, 15, 23, and 53 only and printed with line color inks.
● = Warranty for vertical railroad applications, unprinted colors 10 and 12 have 2 additional years for legibility only.
■ = Warranty requires oven drying the last color of ink series 1900 and screen print 1920DR for 2 hours at 150ºF (65ºC).

(2) Warranty Period Using Sericol Inks

Application: OEM graphics only

Ink and Graphic Protection: Sericol Duracal UV Screen Print Ink and Clear

Warranty Period: 3 years in a vertical exposure

(3) Graphics Warranty for Straight Trucks, Semi-Tractors and Semi-Trailers

The following three provisions and remedies, Sections (3)a, (3)b (3)c, apply only to straight truck, semi-tractor and semi-trailer graphics, as defined in Section 4D, and are in addition to the terms of the 3M™ MCS™ Warranty for the vehicle constructions indicated in the Warranty Period Table, Section F(1), page 5.

a. Lifetime Warranty

The Lifetime Warranty is extended to the original graphics purchaser who still owns the straight truck, semi-tractor or semi-trailer for which any claim is submitted. The additional Labor Reimbursement Remedy, described below, is a pro-rated material replacement and labor reimbursement.

U.S. Exposure		U.S. Desert Southwest Exposure		Percentage of Replacement/ Reimbursement	
6 year, LT	7 year, LT	6 year, LT	7 year, LT	Material	Labor
Failure occurs during year:					
6	7	4	5	100%	100%
7	8	5	6	80%	50%
8	9	6	7	60%	25%
9	10	7	8	40%	10%
10	11	8	9	20%	0%
11	12	9	10	10%	0%
12-14	13-15	N/A	N/A	10%	0%

b. Labor Reimbursement Remedy

3M will reimburse up to 100% of the labor costs for the removal, remanufacture and reapplication of a graphic for *a straight truck, semi-tractor or semi-trailer only* to the extent that 3M determines such amount is reasonable and necessary in the circumstances. This labor cost reimbursement will be determined by 3M on a case-by-case basis taking into account the expected amount of labor needed to make such repairs and other considerations.

c. Legibility Warranty

For Graphics ONLY for Horizontal Exposure and Selected Constructions

Applications subjected to maximum sunlight and environmental conditions used on rooftops of straight trucks, semi-tractors and semi-trailers where identification from the air is needed are warranted for ***legibility only*** for the following constructions. The graphic will change color, lose gloss and chalk.

Values in Years

Film Colors: 10, 12, 13, 14, 15, 25, 53, 54		Horizontal Exposure	
Ink Series	Clear	U.S.	U.S. Desert Southwest
No printing	None	5	3
1900	1920DR, oven dry	5	3
9800	9740i	5	3

(4) Paint Refurbishing Reimbursement Remedy

d. For Commercial and Recreational Vehicles

This Policy applies to commercial vehicles (e.g., automobiles, vans, buses) and recreational vehicles only, and specifically does not include Personal Vehicles or Watercraft. Refer to 3M Instruction Bulletin 5.36 for complete details.

- A *Pre-Installation and Inspection Report* (in Instruction Bulletin 5.36) must be completed ***prior to graphic installation*** and submitted with any claim for paint damage sustained during the removal of 3M removable or changeable graphic film from vehicles.
- A separate report for each vehicle involved in a claim is required.

G. General Warranty Stipulations for 3M™ MCS™ Warranty

These stipulations apply to both the 3M™ MCS™ Warranty. General provisions for these stipulations are covered in the 3M Graphics Warranties Brochure at 3Mgraphics.com.

(1) Reduced Warranty Period for Other Graphic Exposures

For other graphic exposures, multiply the Warranty Period (in years) for your graphic construction as shown in the applicable Warranty Period tables, Section F(1) on page 6, by the percentage shown for the intended graphic exposure. See page 4 for the graphic exposure definitions.

a. Reduced Warranty Period for Other Graphic Exposures with Most Graphic Protection Options

If the Graphic Exposure is:	Use this Percentage of U.S. Vertical Exposure, Warranty Period	Calculation Examples
U.S. Non-vertical	50% (0.5)	0.5 x 7 years = 3.5 years
Desert Southwest Vertical	70% (0.7)	0.7 x 7 years = 4.9 years
Desert Southwest Non-vertical	35% (0.35)	0.35 x 7 years = 2.45 years
Horizontal (Also see Legibility provision Section 5F(3) on page 6)	0%	0

(2) Removal Warranty with Heat or Chemicals

a. For the 3M™ MCS™ Warranty Only

Within the stated Warranty Period, if this film cannot be removed with heat and/or chemicals, or if more than 30% of the adhesive residue remains on the substrate, 3M will reimburse a reasonable portion of extra removal costs.

b. Removal Warranty Exceptions

The following exceptions are not covered by the Removal Warranty.

- Substrate damage due to:
  - removing film from a pre-existing graphic.
  - removing film that was applied to painted wallboard or any unapproved substrate.
  - removing film from paint that is not firmly bonded to the substrate.
- No guarantee is made for:
  - ease or speed of removal of any graphic.
  - removal from paint that is improperly cured.
  - removal from aged paint or metals, surface oxidation or chalking; user must test, approve and accept liability for such applications.
  - removal from horizontally-exposed outdoor applications.

(3) Abrasion and Loss of Gloss

Abrasion damage and loss of gloss are not covered by any 3M Warranty. This is considered normal wear and tear. However, to help maintain the appearance of your graphic, use the recommended graphic protection whenever:

- it is required for the construction and end use as shown in the Warranty Period tables.
- the graphic, **including printed vehicle graphics**, is exposed to abrasive conditions, harsh cleaners or chemicals.

(4) Application Outside the U.S.

Contact the 3M organization for that country.

(5) Application to Glass

3M accepts no liability for glass breakage when using this film for window graphics. See 3M Instruction Bulletin 5.1 for details.

(6) Graphics Made Using Paint Protection Films

- Never laminate paint protection films 7710-LD or SGH6 to the vehicle wrap prior to installing it to the vehicle.
- A vehicle wrap will be eligible for any applicable 3M Warranty only if:
  - the third layer of film is paint protection film 7710-LD or SGH6 and
  - the paint protection film is not applied over an existing overlap, which could create more than three layers.
- The paint protection films 7710-LD and SGH6 cannot be removed from the vehicle wrap without risk of damaging the image on the wrap or pulling up the wrap.

(7) Graphics Made with Components Not Sold or Recommended by 3M

The **3M™ MCS™ Warranty** does not, under any circumstances, cover graphics made with inks, film, graphic protection and/or application tapes that are not sold or recommended by 3M.

The user is solely responsible for the graphic appearance, performance and durability of graphic constructions that include any non recommended or qualified products.

6. Factors that Affect Graphic Performance Life

The actual performance life of a graphic is affected by:

- the combination of graphics materials used.
- ink formulation.
- complete ink drying or curing.
- selection, condition and preparation of the substrate.
- surface texture.
- application methods.
- angle and direction of sun exposure.
- environmental conditions.
- cleaning or maintenance methods.

7. Graphics Manufacturing

⚠ **CAUTION** Before using any equipment, always read the manufacturer's instructions for safe operation.

A. Screen Printing

Formulations and processing conditions can affect ink durability. Refer to the Product and Instruction Bulletins for your ink for limitations and proper usage.

Graphic protection can improve the appearance, performance and durability of your graphic. A clear coat also prevents chalking on unprinted films.

Whether you apply screen print clears with traditional screening methods or roller coating, use equipment designed to handle high viscosity materials and make sure the coating is evenly applied to the specifications in the clear's Instruction Bulletin.

B. Cutting

The following are common cutting methods for this film. See 3M Instruction Bulletin 4.1 for details.

(1) Methods

- Bandsawing
- Hot kiss cutting
- Hot and cold steel rule
- Drum-type electronic cutting
- Flat-bed electronic cutting
- Guillotine
- Hand cut
- Cold and hot steel-rule die cutting
- Knifeless™ Tape, 3M recommends using this product with this film. See http://knife-lesstechsystems.com/Home.aspx for details, including videos and ordering information.

(2) Size of Cut Text

These values are based on upper case Helvetica medium type. Weeding can be more difficult with smaller text.

Minimum stroke width:	0.25 inch (6.35 mm)
Minimum height:	3.0 inch (76.2 mm)
Minimum radius for end of stripe:	0.125 inch (3.18 mm)

C. Graphic Protection

Graphic protection may improve the appearance, performance and durability of the graphic.

- Overlaminates must be cold roll applied.

D. Application Tapes

(1) When to Use Premasking Tape

- Use as an application aid to increase stiffness, and to prevent stretching and damage during application.
- Use when little or no liner is exposed.

(2) When to Use Prespacing Tape

- Hold cut and weeded letters or graphics in registration after removing the film liner.
- Protect cut graphic parts from scratching or damage during application.
- Use when large amounts of liner are exposed.

(3) How to Select a Tape

Determine whether you want to premask the graphic or prespace cut pieces of film such as letters. Then locate the graphic protection used on your graphic in the following table, and use the corresponding tape. See 3M Instruction Bulletin 4.3 for complete details.

EXAMPLE: To premask a film without printing and graphic protection, use premasking tape SCPM-3. To prespace a film with Comply adhesive that includes clear 1920DR, use prespacing tape SCPS-55.

	No Graphic Protection		Graphic Protection			
Tape	Unprinted	Ink Series 9800 only	1920DR	1930	9740i 9730UV	9800CL
Premasking SCPM-3	■	—	■	■	—	—
Premasking SCPM-44X	—	■	—	—	■	■
Prespacing SCPS-2 *film 180 only*	■	—	■	■	—	—
Prespacing SCPS-55 *films with any Comply adhesive*	■	■	■	■	■	■
Prespacing SCPS-53X	—	■	—	—	■	■

— = The use of this application tape is not recommended in this construction.

8. Application and Installation

Install the film using the dry application method.

In addition to other Bulletins specified in this document, the following Bulletins provide details that you may need to successfully apply a graphic.

- Application, special applications and vehicles. 3M Instruction Bulletin 5.4.
- Application, general procedures for indoor and outdoor dry applications. 3M Instruction Bulletin 5.5.
- A guide to understanding and applying graphics to common indoor and outdoor wall surfaces. 3M Instruction Bulletin 5.37.
- 3M™ Vehicle Channel Applicator Tools. 3M Product & Instruction Bulletin V-Tools.

A. Pressure-activated Adhesive

- The pressure-activated adhesive on this film offers:
  - smooth sliding into position on a substrate;
  - fast finger tacking to check position; and
  - easy snap up and repositioning when you need it.
- The **snap up and reposition feature is lost:**
  - when firm pressure with a squeegee or other application tool is applied.
  - at application temperatures above 100°F (38°C) even if only light finger pressure was used for tacking.
  - if any part of the film is removed from the original liner and reapplied to the same or another liner.
  - solvent from inkjet ink has not completely dried or cured, which affects both slide-ability and snap up.

(1) Films with Comply™ Adhesive

Air release channels are a characteristic of films with Comply adhesive. Removing and attempting to change liners or reapply the same liner damages air release channels.

Video

Click here to see how 3M's Comply adhesive technology works.

B. 3M™ Tape Primer 94

Although this product does not require the use of primer 94 in the areas where the film will be stretched, it is always a good practice to use primer to maximize a graphic's bond to its substrate.

C. Application to Vehicles

Read and follow all instructions, and complete the *3M Automobiles, Vans and Buses Pre-installation Inspection Record* in 3M Instruction Bulletin 5.36, prior to manufacturing or applying any graphic to an automobile, van or bus.

D. Application to Other Substrates

Please refer to the 3M Bulletins mentioned in Section 8, on page 10.

9. Maintenance and Cleaning

Use a cleaner designed for high-quality painted surfaces. The cleaner must be wet, non-abrasive, without strong solvents, and have a pH value between 3 and 11 (neither strongly acidic nor strongly alkaline.) See 3M Instruction Bulletin 6.5.

10. Removal

Removal requires heat and/or chemicals. The ease and rate of removal depends on a number of factors. See 3M Instruction Bulletin 6.5 for details. A chemical remover system is available for graphics printed with solvent-based ink. Follow the procedures for using 3M™ Controltac™ Film Remover R-221 and Adhesive Remover R-231 and for additional removal details.

11. Shelf Life, Storage and Shipping

A. Shelf Life

Total shelf life: 3 years from the date of manufacture on the original box.
If you do process the film, do so within 2 years and apply within 1 year.
If you do not process the film, apply it within 3 years.

B. Storage Conditions

- 40° to 100°F (4° to 38°C)
- Out of sunlight
- Clean dry area
- Original container
- Bring the film to print room temperature before using

C. Shipping Finished Graphics

Flat, or rolled printed side out on 6 inch (15 cm) or larger core. This helps prevent the application tape, if used, from popping off.

12. Health and Safety

⚠ CAUTION

When handling any chemical products, read the manufacturers' container labels and the Safety Data Sheets (SDS) for important health, safety and environmental information. To obtain SDS sheets for 3M products go to 3M.com/MSDS, or by mail or in case of an emergency, call 1-800-364-3577 or 1-651-737-6501.

When using any equipment, always follow the manufacturers' instructions for safe operation.

13. Bulletin Change Summary

Modified or new content is marked with a black bar in margin. Updated LifeTime Warranty Periods for US exposures. Added hyperlinks throughout Bulletin. Replaced 3M Related Literature section with hyperlinks within Bulletin.

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